



## Urban Setting

Suburbs



Urban Area



1960's Style Channel



## Harris County Flood Control District's Mission Statement (1990)

To build urban flood control projects that work, with appropriate regard for community and natural values.

To reduce the risk of flood damage by:

- Devising the storm water management plan,
- Implementing the plan, and
- Maintaining the infrastructure



## Background

- About 2500 miles of channels
- 4" rainfall  $\approx$  house flooding begins
- For 18 floods since 1989, house flooding in range of 100 - 4,000 per flood
- Almost all houses flooded more than once were built in the 1960's & 1970's

Our BIG flood - Tropical Storm Allison in June 2001 . . .



## Tropical Storm Allison June 5 – 10, 2001



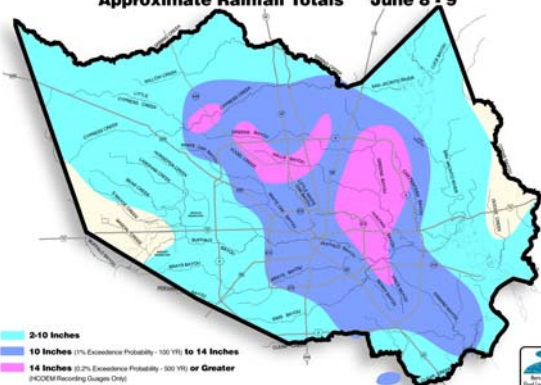
Hunting Bayou, Holiday Forest, 6/9/01 am



White Oak Bayou, I-45 and I-10 Interchange, Downtown, 6/9/01 am



## Tropical Storm Allison Approximate Rainfall Totals June 8 - 9



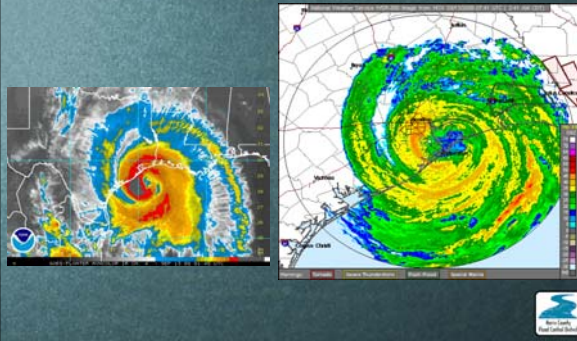
## The Numbers for The Flood

- More than 2 million people *simultaneously* impacted by flooding
- Damage estimate - \$5 billion
- 22 deaths
- 73,000 homes flooded
- 95,000 cars flooded





## Ike Landfall: 2:10 am Saturday, September 13, 2008



## Hurricane Ike Facts – Harris County

- Surge 9-13 feet; Waves  $\pm$  4-6 feet
- Rainfall: 6-8" widespread, 10-13" isolated
- House flooding
  - Surge – 2,500 to 2,600
  - Rainfall – 1,200 to 1,300
- 20+ lives lost in Texas
- \$21 billion of damage; 4th costliest hurricane in US (Katrina, Andrew, Wilma)
- Many people without water for days/weeks
- Most traffic lights out  $\rightarrow$  traffic problems



## Blessings

- Neighbor helping neighbor; Help from others
- Community bonding (no electronics)
- Quantity of supplies and crews in area by Day 3
- Tarrant Regional Water District – food and gasoline
- Cool front for a few days right after hurricane
- People and homes in surge had it the worse
- Only 20+ lives lost in Texas



## The Partnership – Since 1937



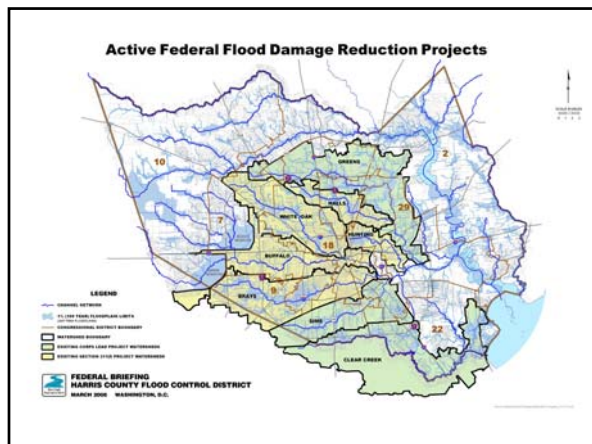
US Army Corps  
of Engineers



## Today, Flood Damage Reduction Projects

- 6 completed
- 3 under construction
- 7 in planning





## Federal Projects

- Goal for Next 5 years :  
Local Share ~\$5-15 M/year  
Federal Share ~\$15-25 M/year
- Typical local sponsor role until 1996
- Corps in lead on 3 projects
- HCFCFD in lead on 7 projects



## Cost Sharing



- Corps of Engineers pays:
  - *Planning, design, and construction*
- Local Sponsor pays:
  - *Share of planning costs*
  - *Right-of-way*
  - *Utility, pipeline, and bridge relocations*
  - *5% cash of total cost*
  - *Operation and maintenance*
- Local Sponsor share must be between 25% and 50% of total cost



## WRDA 1996 – Section 211 “Construction of Flood Control Projects by Non-Federal Interests”

- Allows local sponsor to take the lead in planning, design, and construction
- Corps rules, regulations, and process followed
- Corps monitors and approves work



## WRDA 1996 – Section 211

- All applicable environmental regulations apply – like NEPA
- Cost sharing the same
- Local Sponsor pays all costs up front
- Local Sponsor reimbursed the federal share



## For Section 211(f) Projects Only

- Section 211(f) established eight specific projects in the U.S. to demonstrate the advantages and effectiveness of non-federal implementation.
- Local sponsor can be reimbursed federal share for studies, planning, design & construction if ASA(CW) approval of the project comes after the work is completed.
- PGL 53: Established “discrete segments” to allow for incremental reimbursement.





## Section 211(f) Projects

### WRDA 1996 – 8:

- 3 in Harris County, Texas
- 4 in California
- Las Vegas, NV

### WRDA 2007 – 6:

- 2 in Harris County, Texas
- Perris, CA
- Cook County, IL
- Larose, LA
- Milwaukee, WI



Brays Bayou, Sam Houston Tollway Detention Basin



Public Use During Construction

Aesthetic & Functional Berm Between Channel and Basin



White Oak Bayou, Fairbanks-N. Houston Detention Basin

## Corps Planning Process and Procedures

*Our experience limited to flood damage reduction, Galveston District, and Southwest Division*

- What we like/Don't like
- Problems/Suggestions
- Unofficial Observations



## What We Like About Corps Planning Process

- Process is systematic and detailed
- Analytical requirements are technically sound
- Reports document the process and justify the selected plan
- Data collected useful for other purposes
- Corps staff is generally knowledgeable, helpful, and dedicated



## Things to Not Like About Corps Planning Process

- Cost too high
- Takes a long time
- Team members, local sponsors, and public get frustrated – tedious process
- Reports and reviews go through multiple cycles; too many reviews



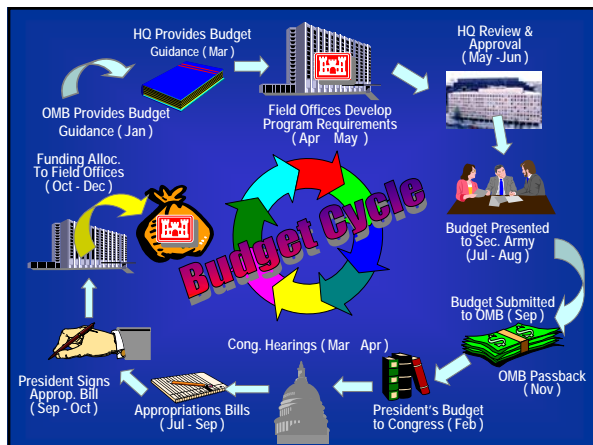
## Problem/Suggestion #1

### *Problem:*

Local sponsors don't understand the Corps process & why it has to be done that way.

### *Suggestion:*

Explain what you're doing and why in non-Federal language. Be realistic with expectations. Let sponsor do some of the work.



## Problem/Suggestion #2

### *Problem:*

Local sponsors get frustrated with Corps "bureaucracy".

### *Suggestion:*

Involve local sponsors in planning process and project identification.

Encourage sponsor to get to know people in Corps at all levels, and help resolve issues.



## Problem/Suggestion #3

### *Problem:*

Corps' lack of practical experience and knowledge of the project area.

### *Suggestion:*

Rely on local sponsor's experience and ability to see "big" picture, as well as get into the details.



## Problem/Suggestion #4

### *Problem:*

Takes too long to identify and build Corps projects.

### *Suggestion:*

1. Simplify the process where possible
2. Apply the recommendations from the Lean Six Sigma team
3. Everyday, remember the people who have flooded and will flood again unless you do something about it





## Unofficial Observations

- Process is complex and you will encounter problems. Follow & trust planning fundamentals and don't give up.
- Corps, Congress, and local sponsors (NAFSMA) are beginning to work together to address and fix the problems. Update of Principles and Guidelines giving us an opportunity.



## Unofficial Observations

- Uncertainty increases the average annual damages.
- Going from GI to CG funding a major milestone in the process not shown in the flow chart. Project Managers need to know major milestones.
- Many steps in process are sequential, not iterative. Iterations cost time & money.

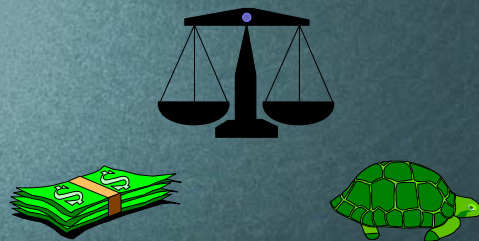


## Unofficial Observations

- Work out a means for effective communication within the Corps "stovepipe" organization, as well as with local sponsors & critical agencies.
- Must use the Principles & Guidelines & ER 1105-2-100, but learn planning from IWR's Planning Manual.
- OMB emphasizes NED and costs. (Changing?)



## Our Biggest Challenge Today ...



**Local Sponsors Can Help!**



## And Another Challenge ...



## It Takes A Lot Of Teamwork

